

CLAIMS

23. An automated drive train for a motor vehicle, comprising:

a single friction clutch, which is actuatable by means of a first actuator and is connected at the input side with a motor of the vehicle,

a step transmission which is connected to the output side of the friction clutch and comprises a first plurality of wheel sets for engaging and disengaging corresponding forward gears and a corresponding plurality of positive gear shift clutches, the gear shift clutches each having synchronization means and being actuatable by a second plurality of second actuators for engaging and disengaging the gears, wherein each of the synchronization means are suitable for synchronization under partial load, and wherein at least one of the second actuators is configured to control two gear shift clutches, the two gear shift clutches are associated with gears not neighboring one another and two further gears lie between the two gears, and

a controller for controlling the first actuator and the second actuators in coordination with one another, wherein the controller controls the actuators, such that at least one type of gear change takes place without the friction clutch being completely open.

24. An automated drive train for a motor vehicle, comprising:

a single friction clutch, which is actuatable by means of a first actuator and is connected at the input side with a motor of the vehicle,

a step transmission which is connected to the output side of the friction clutch and comprises a first plurality of wheel sets for engaging and disengaging corresponding forward gears and a corresponding plurality of positive gear shift clutches, the gear shift clutches each having synchronization means and being actuatable by a second plurality of second actuators for engaging and disengaging the gears, wherein each of the synchronization means comprise a cone synchronizer having a cone angle of more than 6° , and are suitable for synchronization under partial load, and

a controller for controlling the first actuator and the second actuators in coordination with one another, wherein the controller controls the actuators, such that at least one type of gear change takes place without the friction clutch being completely open.

25. The drive train of claim 24, wherein at least one of the second actuators is configured to control two gear shift clutches, the two gear shift clutches are associated with gears not neighboring one another and two further gears lie between the two gears.

26. The drive train of claim 24, wherein the gear shift clutch has asymmetrically tipped teeth on a sliding sleeve actuatable by the actuator.

27. The drive train of claim 24, wherein the gear shift clutch comprises gear teeth not having a back cutting on the sliding sleeve actuatable by the actuator, or on the coupling body.

28. An automated drive train for a motor vehicle, comprising:

a single friction clutch, which is actuatable by means of a first actuator and is connected at the input side with a motor of the vehicle,

a step transmission which is connected to the output side of the friction clutch and comprises a first plurality of wheel sets for engaging and disengaging corresponding forward gears and a corresponding plurality of positive gear shift clutches, the gear shift clutches each having synchronization means and being actuatable by a second plurality of second actuators for engaging and disengaging the gears, wherein each of the synchronization means comprise a multi-disc synchronizer, and are suitable for synchronization under partial load, and

a controller for controlling the first actuator and the second actuators in coordination with one another, wherein the controller controls the actuators, such that at least one type of gear change takes place without the friction clutch being completely open.

29. The drive train of claim 28, wherein at least one of the second actuators is configured to control two gear shift clutches, the two gear shift clutches are associated with gears not neighboring one another and two further gears lie between the two gears.

30. An automated drive train for a motor vehicle, comprising:

a single friction clutch, which is actuatable by means of a first actuator and is connected at the input side with a motor of the vehicle,

a step transmission which is connected to the output side of the friction clutch and comprises a first plurality of wheel sets for engaging and

disengaging corresponding forward gears and a corresponding plurality of positive gear shift clutches, the gear shift clutches each having synchronization means and being actuatable by a second plurality of second actuators for engaging and disengaging the gears, wherein each of the synchronization means are suitable for synchronization under partial load,

a controller for controlling the first actuator and the second actuators in coordination with one another, wherein the controller controls the actuators, such that the drive train is controlled to carry out a gear change under one of three possible modes depending on the conditions of the gear change to be made, wherein the three possible modes of gear changes take place with an opened, a closed or with a slipping friction clutch, and wherein at least one of the second actuators is configured to control two gear shift clutches, the two gear shift clutches are associated with gears not neighboring one another and two further gears lie between the two gears.

31. An automated drive train for a motor vehicle, comprising:

a single friction clutch, which is actuatable by means of a first actuator and is connected at the input side with a motor of the vehicle,

a step transmission which is connected to the output side of the friction clutch and comprises a first plurality of wheel sets for engaging and disengaging corresponding forward gears and a corresponding plurality of positive gear shift clutches, the gear shift clutches each having synchronization means and being actuatable by a second plurality of second actuators for engaging and disengaging the gears, wherein each of the

synchronization means comprise a cone synchronizer having a cone angle of more than 6°, and are suitable for synchronization under partial load,

a controller for controlling the first actuator and the second actuators in coordination with one another, wherein the controller controls the actuators, such that the drive train is controlled to carry out a gear change under one of three possible modes depending on the conditions of the gear change to be made, wherein the three possible modes of gear changes take place with an opened, a closed or with a slipping friction clutch.

32. The drive train of claim 31, wherein the gear shift clutch has asymmetrically tipped teeth on a sliding sleeve actuatable by the actuator.

33. The drive train of claim 31, wherein the gear shift clutch comprises gear teeth not having a back cutting on the sliding sleeve actuatable by the actuator, or on the coupling body.

34. An automated drive train for a motor vehicle, comprising:

a single friction clutch, which is actuatable by means of a first actuator and is connected at the input side with a motor of the vehicle,

a step transmission which is connected to the output side of the friction clutch and comprises a first plurality of wheel sets for engaging and disengaging corresponding forward gears and a corresponding plurality of positive gear shift clutches, the gear shift clutches each having synchronization means and being actuatable by a second plurality of second actuators for engaging and disengaging the gears, wherein each of the

synchronization means comprise a multi-disc synchronizer, and are suitable for synchronization under partial load,

a controller for controlling the first actuator and the second actuators in coordination with one another, wherein the controller controls the actuators, such that the drive train is controlled to carry out a gear change under one of three possible modes depending on the conditions of the gear change to be made, wherein the three possible modes of gear changes take place with an opened, a closed or with a slipping friction clutch.